L Number	Hits	Search Text	DB	Time stamp
1	1	paper adj width adj (sensor detector) same edge same center	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/10/29 12:18
2	1	paper adj edge adj (sensor detector) same edge same center	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/10/29 12:19
3	2	medium adj edge adj (sensor detector) same edge same center	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/10/29 12:33
4	29	(medium paper substrate) adj edge adj (sensor detector) and edge same center	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/10/29 13:09
5	87	printer and edge adj (detect$3 sensor) same candidate	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/10/29 13:11
6	13	printer and edge adj (detect$3 sensor) same candidate adj edge	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/10/29 13:17
7	7	(printer and edge adj (detect$3 sensor) same candidate adj edge) and edge same center	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/10/29 13:18

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DISCLOSURE TEXT:

5p. Disclosed in this article is apparatus by which an all-points-addressab **printer** may be controlled by the user so that he may design and/or type his own special characters or graphics, including letterheads, etc. It is assumed that the **printer** is interactive and that the matrix printhead 18 includes a scanner or the like mounted on the carrier for movement across print media 1 mounted on a platen 12. With the apparatus described hereinafter, the user is given freedom to generate his own set of custom graphics.

- In a conventional impact typewriter, each character is printed when a type face with a desired character embossed on the surface thereof is pressed against a ribbon onto the paper, leaving ink in the shape of the embossed area. Conventionally, the characters that may be printed are fixed in number and kind even when the type elements that are used on the typewriter are changeable. Moreover, special characters are limited to a size approximately equal to one character space. In order to obtain special characters, users must request that a special engineering design of the desired character be built into a special element. This process is expensive and time consuming.

Described below is a means by which the customer can easily design his own characters and program those characters into a matrix printing interactive **printer,** for example, an electronic typewriter without the need for external help or special equipment.

- The apparatus for accomplishing the same is illustrated best in the drawing. A preprinted form 1 contains a reference bar A and a grid B. Each grid element C corresponds to its particular spot in the

character box or character matrix of the matrix printhead. Inasmuch as the interactive **printer** to which the subject matter may be applied may also be used to draw forms or the like, the form or grid structure itself may be printed by the **printer** when required.

- The scanner 2 in the drawing is capable of detecting black and white areas on the preprinted form 1, and sending appropriate signals to the signal processing and control electronics (SPCE) 3. The carrier 4 moves laterally across the print media or preprinted form 1 as is conventional except that the carrier drive 5 is capable of moving the carrier at a steady velocity across the paper as well as moving incrementally when, for example, the **printer** is in the interactive mode for typing, for example, individual characters. As illustrated, the carrier drive comprises a drive motor 6, a lead screw 7, and an anti-backlash nut 8, an emitter wheel and **sensor** 9, signal processing electronics 10 and motor drive control electronics 11.

The emitter wheel and **sensor** 9 provide signals which are used to control the drive motor and to provide information on changes in the

horizontal position of the carrier 4 to the SPCE 3.

- The typewriter platen 12 is driven by the index drive mechanism 13 which includes a second emitter wheel and **sensor** 14, an index drive motor 15, motor drive and control electronics 16 and signal processing electronics 17. These are combined in a conventional fashion so that on each command from the SPCE 3, the platen 12 causes the paper to move up by an amount determined by the SPCE 3, for example, 1/96, 1/8 or 1/6 inch. Further, the output of the signal processing electronics 17 may be fed to the SPCE 3 so that information on exact indexing of the platen may be determined by the SPCE 3.

- The matrix printhead 18 prints characters, numbers, etc., by forming the printed image from a matrix of spots. The spots may be generated by any appropriate technology, such as drop-on-demand ink jet, synchronous ink jet as is used in the IBM 6640, a laser xerographic technology such as is employed in the IBM 6670, or even with an impact **printer** suitably designed to print spots in the appropriate matrix position. Of course, this does not preclude other matrix **printer** technology that permits the addressing of a particular

point on a print media.

- The system is preferably designed so that a predetermined relationship exists between the various parts. The platen 12 and the index drive 13 and the length of the side of the grid area C are so designed that the index **distance** can be made equal to the length of the side of grid square C, for example, both equal to 1/8 inch.

Further, the index mechanism is designed so that it may index a **distance** much smaller than the length of a side of a grid square, for example, 1/96 inch. The side of the reference bar A is made some fixed and known **distance,** for example, equal to the side of a grid square. The bar may be spaced above the grid also by some fixed and known **distance,** for example, equal to the side of a grid square.

The resolution of the information from the emitter wheel 9 and the signal processing hardware 10 about the horizontal position of the carrier and bar code scanner is much finer than the length of the side of a grid square C. It is also simpler if this resolution is a sub-multiple of the length of the side of the grid square, for example, 1/240 inch.

- In the drawing, the grid matrix along dimension E contains a number of grid squares equal to the number of spots in the vertical dimension of the character matrix printed by the matrix printhead 18 (for example, 40). The grid spacing on the preprinted form in dimension D is the same as the grid spacing along dimension E. The spacing of spots in a horizontal direction of the **printer** matrix under these circumstances should be the same as that in the vertical direction. Thus each square and grid of the preprinted form 1 corresponds uniquely to a spot that may be printed by the **printer**.

Since the **printer** prints continuously in a horizontal direction, the form 1 may be extended in the D dimension to any desired and practical length up to the length of the print line.

In the sample form shown, the length of the dimension E may, for example, be equal to 3/10 inch if a **printer** resolution of 240 pels/inch is employed.

The grid elements do not have to be square, but it is preferable that the grid elements have the same proportions as the spots printed by the **printer** so that the figure printed has the same

proportion as the
one drawn on the preprinted form.
- The spot matrix storage electronics 20 may be a random-access
memory such that as the head scans the preprinted form with a
particular character or symbol thereon, such as the cross or large X
which is the user-drawn figure on the preprinted form 1 shown on the
platen 12, a one may be stored for the darkened grid areas and a zero
for the undarkened grid areas.
- In operation, the user will darken each square on the
preprinted form where a spot is required in order to produce the
desired configuration when printed.
- The preprinted form with the desired grid areas darkened is
then inserted squarely into the machine with the orientation shown in
the figure. When the form is loaded, the SPCE 3 moves the carrier to
the left to detect the left **edge** of the form, and then to the right
to detect the right **edge**. Initially, the reference bar is set below
the reading line of the scanner 2. The operator may then initiate
the reading of the form by appropriate manipulation of the operator
interface (keyboard or the like) 21.
- The SPCE 3 activates the index drive 13 until the

scanner 2
detects the reference bar A. Indexing continues until the reference
bars **center** vertically under the scanner 2. The SPCE 3 now has
sufficient information to move the scanner over each row of squares
in the grid of the preprinted form and to know which square the
scanner 2 is reading.
- The scanner 2 determines whether each square has been darkened
or not, and the SpCE 3 stores the appropriate logic level in the spot
matrix storage electronics or random-access memory 20. The bit
representation stored in the random-access memory 20 may be given a
label or name as specified by the operator through the operator
interface 21. To play back or print the symbol, the operator keys
the name or label together with appropriate control operations, and
the **printer** prints the stored pattern. If the grid is truly
proportional to the character grid electronics, the graphics or
character, etc., will be reproduced in a reduced form. For example
with the dimensions heretofore given, and assuming the 240 pel/inch
matrix, a reduction of approximately 30:1 between the form the user

fills in and the actual printed output will occur.

- If the resulting figure is not as the user desires, he may modify the figure on the preprinted form and repeat the process until the desired result is achieved.

- Once the desired figure is achieved, a representation of the figure, character or graphics may be stored on any available medium, such as bar code on the paper or magnetic media, etc. The figure then may be more quickly read into the spot matrix storage electronics the next time it is to be employed.

- Alternatively, and if desired, an X or other character may be stored for every darkened pel on the input form and a blank or period may be stored for every undarkened pel so that the information gleaned from the scanning operation may be processed in text storage.

Such characters would appear as normal text to the machine and be capable of playback as printable information, while storing the information in the spot matrix storage electronics 20.

- This modification allows the operator to print out the text representative of the symbol, character, figure, etc., such as the X or cross in the figure. The operator may then easily identify, using the text presentation, what parts of the scanned graphics, if

any,
require editing. Thus normal text editing may be employed by causing
the storage of the darkened areas to be in a normal text editor-type
representation. Moreover, the symbol, graphics or the like may be
stored or reprinted at any time for more editing or modification.
- Thus the illustrated apparatus gives the user the ability to
custom design his own characters, figures or logos without requiring
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--------- KWIC ---------

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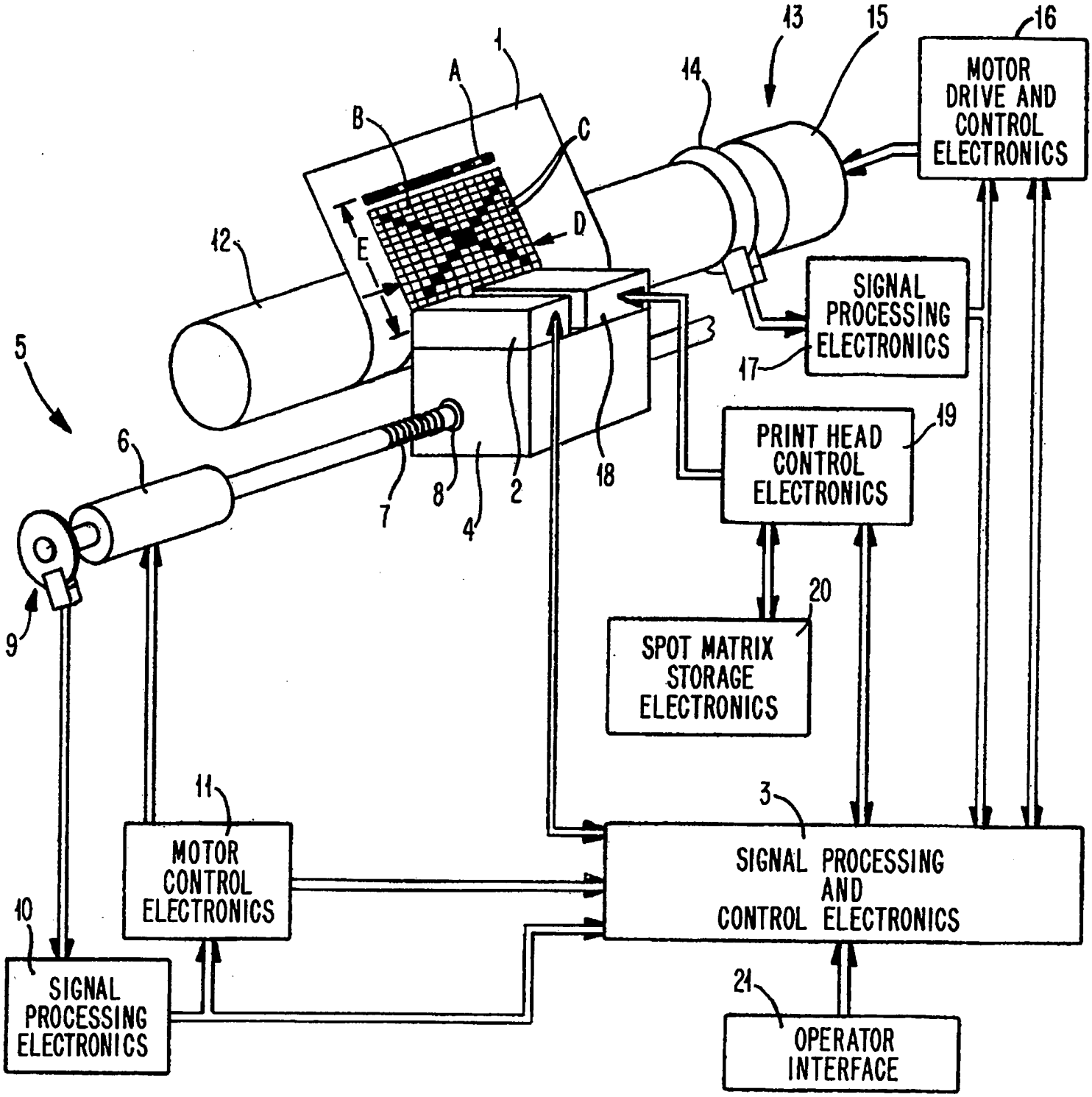
MOTOR DRIVE AND CONTROL ELECTRONICS
SIGNAL PROCESSING ELECTRONICS
PRINT HEAD CONTROL ELECTRONICS
SPOT MATRIX STORAGE ELECTRONICS
MOTOR CONTROL ELECTRONICS
SIGNAL PROCESSING AND CONTROL ELECTRONICS
SIGNAL PROCESSING ELECTRONICS
OPERATOR INTERFACE
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